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DISSEMINATION CONTROL ABBREVIATIONS

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Central Intelligence Agency

Washington, D.C. 20505

Directorate of Intelligence

January 1985

Development of Sutormin Oilfield, USSR

Summary

Sutormin Oilfield, one of the new generation of oilfields in the West Siberian Basin, is in an early stage of development. Seismic exploration occurred there as early as 1973, and the initial discovery well was drilled in 1976. Production drilling began in late 1982, and 204 production wells were drilled by January 1984. We estimate that only 165 of the production wells were in operation at that time. (S

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Sutormin has some of the largest well pads in the Soviet Union, with as many as 88 production wells per pad. Based on the number of existing well pads and their associated reserve pits, we estimate that Sutormin eventually will have at least 1,500 production wells. (S

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Information available as of November 1984 was used in this report. (U)

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There is one gathering center, centrally located in the oilfield, to initially process the crude oil produced. The capacity of oil holding tanks under construction in the gathering center suggests planned crude oil production could eventually be about 756,000 barrels per day. (S [redacted] 25X1

The 1983 oil production at Sutormin did not meet Soviet planning goals. Development had not progressed sufficiently to support planned levels of production. Although the Soviets are rapidly drilling new wells, they are slow in bringing them on line. Because of this slowness and the fact that they had not begun using water injection as of March 1984, we believe they are attempting to develop the field at a pace designed to foster the recovery of a maximum amount of the available oil rather than maximizing short-term production. (S [redacted] 25X1

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Introduction

The successful development and exploitation of new oil and gas fields during the 1980s will be important to the Soviets, who have acknowledged that they are experiencing serious production problems. Production from new fields is needed to offset declines at older fields, such as at the supergiant Samotlor. One such new field, Sutormin, is located in the remote permafrost region of the West Siberian Basin (figure 1). It is one of five oil and gas fields in the Noyabr'sk Oil and Gas Production Association.[1] (TS [redacted] 25X1

This report provides an analysis of Sutormin's development from November 1973 to November 1984. [redacted] 25X1
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[redacted]

Field Development

Sutormin is a moderate-size oilfield approximately 100 square kilometers in area. Seismic exploration was observed there as early as 1973, and two exploratory wells were drilled about three years later. As of July 1982, we estimate that at least 30 delineation wells had been drilled at Sutormin to define the limits of the oilfield. We cannot, however, determine the limits of the oilfield since 1982 [redacted] (S [redacted] 25X1
25X1

By July 1982 a hardsurface road and power transmission lines were in place. The road and powerlines run from the production association's regional gathering center[2] to the oilfield. (S [redacted] 25X1
25X1

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[1]The other four fields are Karamov, Kholmogor, Muravlenko, and Vyngapur. (TS [redacted] 25X1

[2]A regional gathering center serves several oilfields as a main collection and processing center for the crude produced at these oilfields. (U)

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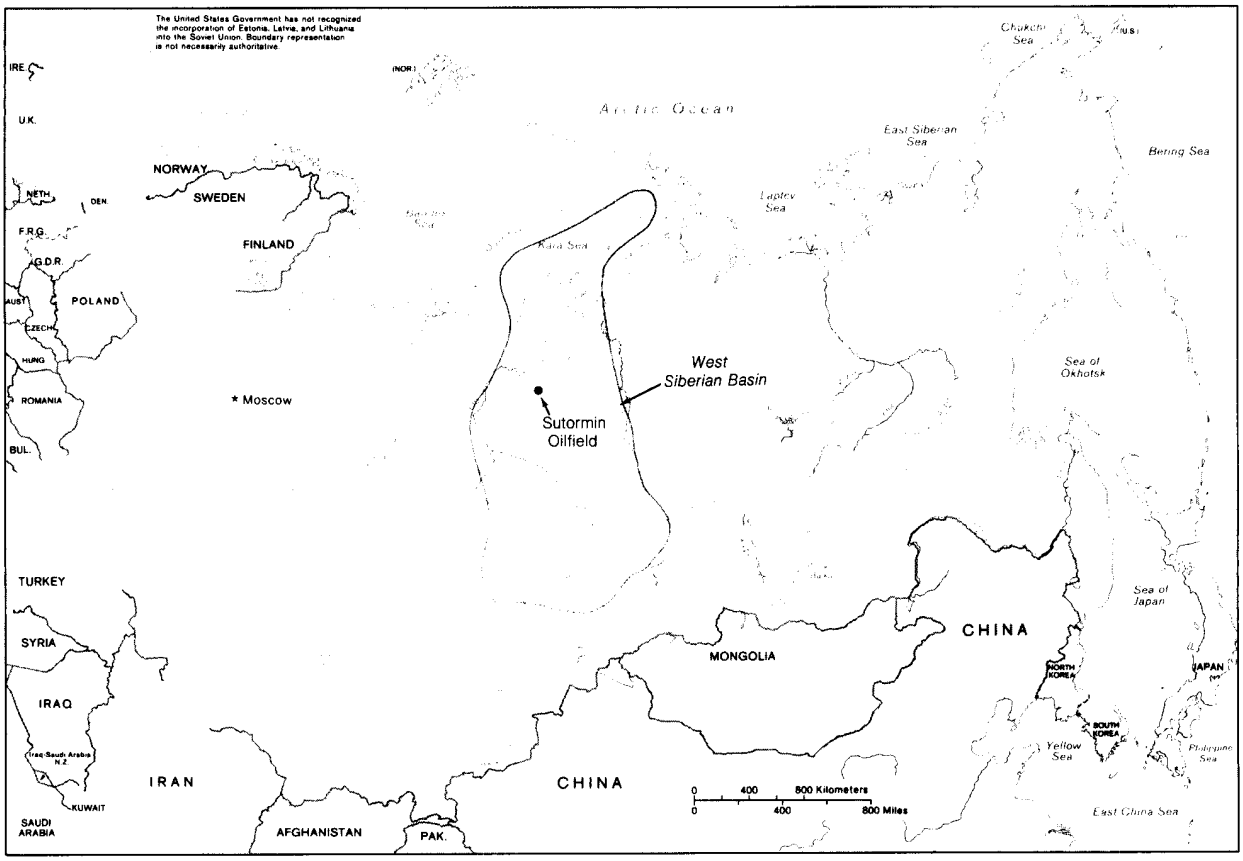
Figure 1
Location of Sutormin Oilfield, USSR



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Production at Sutormin probably began with a delineation well, possibly during the latter part of 1982. Drilling of production wells did not begin at Sutormin until late 1982. As of January 1984, 204 production wells had been drilled, but snow melt at wellheads and on gathering lines indicated that only 165 production wells were producing. (S [redacted] 25X1

Well pads are used at Sutormin as at other West Siberian oilfields. They consist of built-up layers of logs and gravel which support the drilling and production equipment. The Soviets will be able to save time and resources by using these giant well pads because they minimize the surface area of the field, shortening the total length of roads, electric powerlines, and pipelines. Maintenance of the field and its facilities should be easier as well. Because the larger pads will hold more wells, drill rigs will not have to be disassembled as often for use at another site, and well drilling and completion rates should be shorter. (S [redacted] 25X1

Reserve pits, which are shallow excavations surrounded by earthen embankments to contain waste mud and other fluids produced in drilling, are located adjacent to the well pads. Originally, the largest well pad at Sutormin had 80 wells and 10 reserve pits (figure 2). Accordingly, we estimated that there would be eight wells for each pit of the same size at Sutormin. However, there is now one pad at Sutormin with 11 such reserve pits, suggesting the pad will probably contain 88 wells. In addition, some reserve pits are twice as large in size, and we believe they will serve 16 rather than eight wells. The smallest pad at Sutormin has only four reserve pits, and it will likely have only 32 wells. (S [redacted] 25X1

On the basis of the 24 well pads that were complete or were under construction in January 1984 (figure 3) and the number and size of reserve pits at each pad, we believe that at least 1,500 production wells will be drilled at Sutormin. We estimate that all could be completed by 1989. This estimate is based on a drilling average of 0.75 well per drill rig per month, which is derived from data collected at other Soviet oilfields, and on our assumption that the high number of drill rigs will remain constant at Sutormin. Thirty-six drill rigs were present at the beginning of 1984, which is a large number of rigs compared with other Soviet oilfields we have studied. The high rig count suggests that the Soviets are trying to complete drilling on the pads as rapidly as possible. (S [redacted] 25X1

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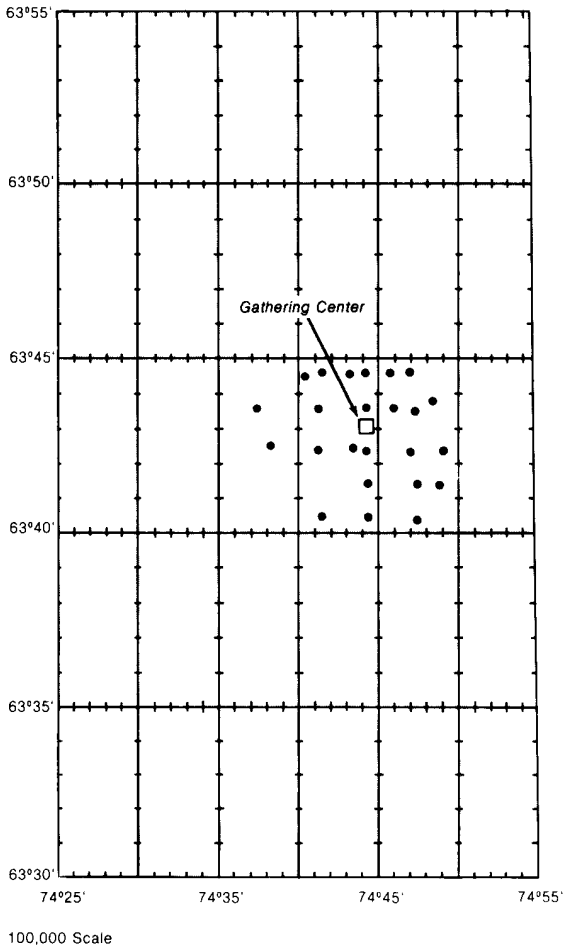
Recovery Methods

[redacted] the Soviets are probably using an artificial lift recovery method at Sutormin which employs submersible, electric, centrifugal pumps to lift oil to the surface. Based on the presence of surface equipment, such as transformers that serve the centrifugal pumps, we estimate that about 75 wells were using submersible pumps at the beginning of 1984. (S [redacted] 25X1

Two other methods of artificial lift that the Soviets use--sucker rod pumps and gas-lift--were not in use at Sutormin as of January 1984. However, we expect to see sucker rod pumps installed as the field ages and reservoir pressures drop. We doubt that gas-lift will ever be used at Sutormin. A detailed reservoir analysis of Sutormin [redacted] 25X1 suggests that the field is producing only a small amount of gas and that the Soviets are flaring it. The only other source of gas to use for gas-lift is a pipeline, located approximately 50 kilometers to the east of Sutormin, that comes from the Urengoy Gasfield. Currently, there is no connecting pipeline from Sutormin Oilfield to this gas pipeline. (S [redacted] 25X1

Figure 3
Locations of Giant Well Pads, Sutormin Oilfield, January 1984 25X1



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Special intelligence indicates that 400,000 cubic meters of water were to be injected at Sutormin in 1983. However, no water injection facilities were in operation as of March 1984. [redacted] 25X1

[redacted] In addition, small 25X1 buildings have been constructed on several well pads. These

[redacted] 25X1

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buildings could contain water injection metering equipment. The Soviets probably are already drilling injection wells and building the necessary surface facilities to prepare for a subsequent water injection program. Because Sutormin is a sandstone reservoir and natural water drives are common to these reservoirs, the Soviets may be relying on this drive at the present time for oil recovery. (TS [redacted] 25X1

Production and Processing System

The oil production and processing system at Sutormin includes a gathering system, a gathering center, and one pipeline. (S [redacted] 25X1 [redacted] 25X1

The gathering system consists of test separator equipment on the well pads and the gathering lines. The crude oil flows from the wells to a test separator on the pad, which measures the gas-oil ratio in the crude. The crude then goes via gathering lines to the gathering center (figure 4), where it is initially processed. (S [redacted] 25X1

There are three types of equipment for the initial processing of crude oil at Sutormin. The equipment includes first- and second-stage separators and crude oil holding tanks. The first- and second-stage separators remove gas and water from the oil by mechanical means; the holding tanks remove water by settling. By November 1983, there were two first-stage separators and five second-stage separators at the gathering center. The two first-stage separators were stacked with two of the second-stage separators. Only this group was operating. By July 1984 the Soviets had installed eight cylindrical tanks--possibly separators or surge tanks for stabilizing pressure--and then housed these tanks in a large building. By October 1984 a battery of eight second-stage separators and a battery of three first-stage separators had been added. (S [redacted] 25X1

By March 1984, two of a battery of six crude oil holding tanks were under construction. An additional battery of six crude oil holding tanks has been under construction since August 1984. Each of the crude oil holding tanks in both batteries has a capacity of 63,000 barrels. Also by March 1984, three water holding tanks were built for temporary storage of the water produced during the demulsification process,[3] but they probably

[3]During demulsification, residual water is removed from the oil by physical means. In the holding tanks, gravity separation allows most of the remaining water to settle out. (U)

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were not operating. They lacked the necessary electrical conduits, pipes, and pressure release valves. A fourth water holding tank has been under construction since June 1984 and by October an additional two were begun. Each of the tanks has a capacity of 31,500 barrels. (S [redacted] 25X1

Other small structures at the gathering center are of a modular design. We believe they may house either generators, pumps, or both. There is probably only one pipeline that carries crude away from Sutormin to the regional gathering center. It was under construction in September 1980 and completed by July 1982. (S [redacted] 25X1

Production Levels

A Soviet publication reported that Sutormin's daily yield in 1982 was almost 1,000 metric tons (7,500 barrels). This was unlikely, because the only well that was possibly producing in 1982 was a delineation well, and 1,000 metric tons of oil a day would be much more than could be expected from a well intended to define the limits of an oil deposit. Moreover, the pipeline to the regional gathering center was not completed until mid-1982. (S [redacted] 25X1

Special intelligence indicated that the planned production for 1983 at Sutormin was 1,365,000 metric tons (10,237,500 barrels). The Soviets probably did not meet this goal for two reasons:

- Special intelligence reported that in June 1983 Sutormin suffered serious production problems and that in July 1983 only 35,000 metric tons (262,500 barrels) were produced.

- Production drilling did not begin until late 1982, and only 165 wells were producing in January 1984.

Special intelligence also has reported that during the first three months of 1984, the entire Noyabr'sk association fell short of its production goals. (TS [redacted] 25X1

Although Sutormin's initial productivity has been less than expected, the Soviets are maintaining a high level of effort in developing the oilfield. Once all the tanks in the gathering center are completed, Sutormin's crude oil holding tank capacity will be 756,000 barrels. An analysis of selected oilfields has indicated that holding tank capacity at Soviet oilfields is designed for one day's planned crude oil production. The initial production shortfalls at Sutormin apparently have not deterred the Soviets from expecting higher daily production in the future. (TS [redacted] 25X1

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The Soviets have often emphasized short-term production at the expense of obtaining maximum recovery of oil from an oilfield. In view of the recent Soviet acknowledgment of production problems in West Siberia, however, this approach may be changing. The Soviets appear to be developing Sutormin slowly and cautiously. They are drilling quite rapidly, but are not immediately putting every well into production once it is drilled. As of March 1984, they had not yet begun injecting water, which if done too soon or hastily can damage a reservoir and decrease the maximum recovery. Although not all of the facilities and equipment are operational, we have no reason to believe that this is due to shortages of manpower or supplies; the Soviets have maintained construction activity at the gathering center, as well as at the various support areas located throughout the oilfield. Consequently, Soviet efforts at Sutormin may reflect a carefully planned program for development of the oilfield, which could result in the maximum recovery of oil. (S [redacted] 25X1

[redacted] 25X1

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